

REMARKS

In view of the foregoing amendments and following remarks, reevaluation and further processing of the application is requested. Prior to amendment herewith, Claims 1-12 were pending in the application. By amendment herewith, Claim 1 has been amended, Claims 2-3 and Claims 6-10 have been canceled, and new claims 13-27 have been added. Thus, Claims 1, 4-5, and 11-27 remain pending in the application.

In the Office Action, the Examiner objected to claims 2, 3, 6-8, and 10 as being of improper dependent form. The Examiner provides that those claims appear to be operational methods of running the cell rather than apparatus features to further limit the cell features.

Applicant has cancelled claims 2-3 and 6-10, without disclaimer to subject matter contained therein. Cancellation of these claims is not related to patentability of the instant invention. Applicant has added new method claims 24-27, which cancelled claims 2-3 and 6-10 may form at least a portion of the basis for those claims.

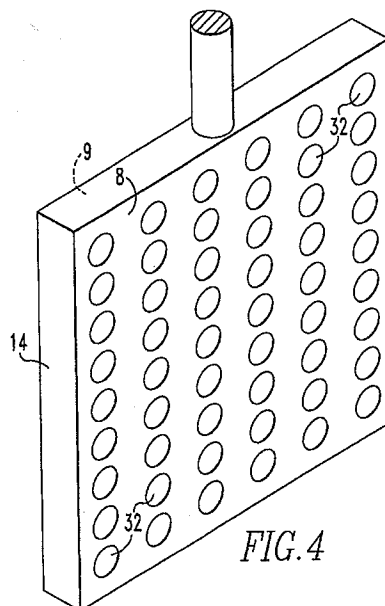
The Examiner has rejected all pending claims under 35 U.S.C. § 103 as being obvious over U.S. Patent Application Publication No. 2003/0173227 to Barnett et al. (Barnett). The Examiner states that Barnett discloses carbon anodes having apertures therethrough. The Examiner alleges that the subject matter of the present inventions as a whole would have been obvious to one having ordinary skill in the art because even though Barnett does not specifically disclose that the height of the slots to be 45 to 80% of the anode thickness, it appears from the Barnett disclosure that the heights of the slots are within the ranges as set forth in applicants instances claims. The Examiner further alleges that since the electrolyte is moved by gas bubbles, the gas bubbles themselves would have to move in the apertures toward the alumina particles. The Examiner also alleges that the diameter listed for the apertures in the prior art of Barnett appear to meet the requirements set forth in applicant's instant claims. The Examiner thus concludes that the disclosure of Barnett renders the instant invention obvious. Applicant respectfully traverses this rejection.

As noted in MPEP § 2143, to establish a prima facie case of obviousness, three basic criteria must be met:

1. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;
2. There must be a reasonable expectation of success; and
3. The prior art reference (or references when combined) must teach or suggest all the claim limitations.

Here, it would not have been obvious to modify the invention of Barnett to achieve the instant invention as, for example, there is no motivation to modify Barnett to achieve the instant invention and Barnett does not teach all claim limitations of the instant invention.

Barnett discloses a aluminum electrolysis cell for producing aluminum using planar electrodes. (Abstract) Barnett's cathodes and anodes are disposed in alternating or interleaving fashion in an electrolyte bath to provide anode planar surfaces disposed opposite cathode planar surface where electric current is passed from the anodes to the cathodes to facilitate production of aluminum. (Abstract). In one embodiment of the invention, the anodes can include apertures, as illustrated in Barnett's Figure 4.



The apertures 32 extend all the way through the anode 14 so as to minimize starvation of alumina at the active surface 8 of the anode:

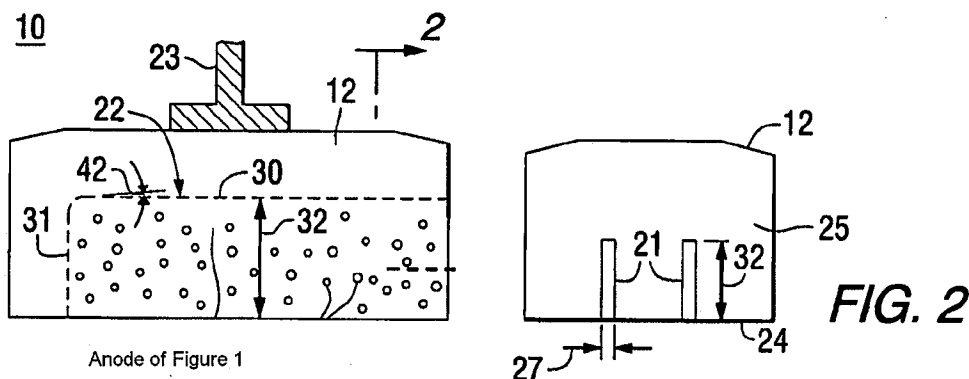
In the present invention, apertures 32 are provided to permit flow of alumina-enriched electrolyte to be quickly available at active surfaces 8 of [the] anodes 14. Thus, during operation of cell 10, molten electrolyte flows downwardly adjacent walls 4 and 6 and simultaneously therewith flows through holes or apertures 32 supplying alumina laden or enriched electrolyte to anode active surfaces 8. This has the advantage of minimizing starvation of alumina at the active surface of the anode.

[Para. 0032]. Barnett further provides in Paragraph 33 that the apertures have additional benefits in that the active surface area of the anode is increased:

The apertures provided in anodes 14 have another benefit. That is, depending on the number of apertures and the thickness of the anode, the apertures can contribute to the active surface area of the anode. Thus, in the present invention, ratio of anode active surface to cathode active surface can range from 1:1 to 1:5.

Thus, the apertures of Barnett appear to facilitate Barnett's stated objectives of providing improved methods of supplying alumina-enriched electrolyte to the active surface of an anode and of operating a low temperature electrolytic cell employing planar carbon anodes. [Para. 0012-0013].

Conversely, the present invention relates to non-continuous slots in a traditional carbon anode. As best illustrated in Figures 1 and 2, portions of which are reproduced below, the non-continuous slots 21, defined by dotted lines 22, extend only partially through the anode 12 as seen via the by top/roof 30 and back wall 31 of the non-continuous slots 21.



The non-continuous slots are used to channel / direct gas bubbles that are generated during operation of the cell (e.g., generated underneath the bottom surface of the anode) towards the

centerline of the cell so as to, for example, restrict bubble flow away from the sides of the electrolysis cell to lessen sidewall erosion caused thereby (Para. 0019), and increase the operating efficiency of the cell by reducing gas interference with electrical conduction (Para. 0012).

In view of the foregoing, Applicant respectfully submits that there are many reasons the present invention is not obvious in view of Barnett. For instance, Barnett does not teach all claim limitations of the instant invention. *See* MPEP § 2143.03 (“To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.”) By way of example, Barnett does not teach non-continuous slots, as provided by amended Claim 1 and new Independent Claims 13 and 24. Barnett teaches apertures that extend all the way through the anode. Barnett makes no disclosure, suggestion or teaching that the his apertures should not extend completely through the anode. Conversely, the present invention requires non-continuous slots, as illustrated in Figure 1 of the instant application, non-continuous meaning that the slots do not extend all the way from one side of the anode to another side. Indeed, Barnett would not assert that his apertures could extended only part-way through the anode, since to do so would not achieve his goal of minimizing starvation of alumina at the active surface of the anode. Thus, Barnett does not disclose, teach or suggest the use of non-continuous slots, as provided by Claims 1, 13, and 24, and hence does not render those claims obvious.

Furthermore, one of ordinary skill in the art also would not be motivated to substitute the apertures of Barnett with the non-continuous slots of the instant invention since to do so would not allow Barnett’s anodes to function in accordance with the desired goal of minimizing starvation of alumina at the active surface of the anode. *See* MPEP § 2143(V) (“If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)”).

As illustrated in Figure 3 of Barnett (provided below) and supplemented by his description in Para. 0031-0034, Barnett's anodes 14 and cathode 16 are both vertically oriented and completely submerged in the electrolyte bath 18 to facilitate production of aluminum 20. To facilitate flow of electrolyte 18 from the non-active surfaces 9 of the anode 14 to the active surfaces 8 of the anode 14, Barnett provides apertures 32. If non-continuous slots were substituted for Barnett's apertures 32 there would be no way for the electrolyte 18 to flow through the anode 14 from the non-active surface 9 to the active surface 8 of the anode 14. In fact, if non-continuous slots were used, the electrolyte 18 would have to flow completely down and around the anodes 14 to reach the active surfaces 8, completely obviating the reason for using the apertures in the first place. Hence, one of ordinary skill in the art would not be motivated to use non-continuous slots as a substitute for the apertures of the Barnett.

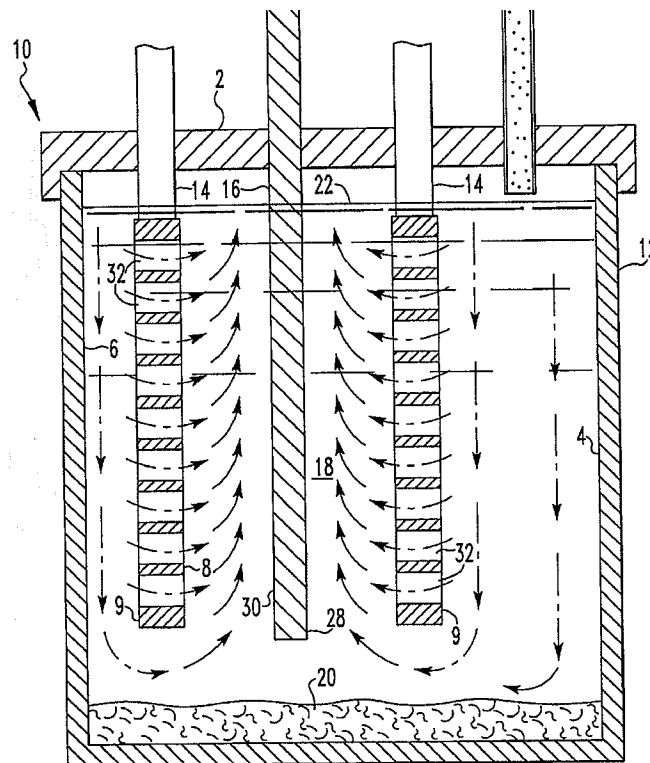


FIG. 3

In view of the foregoing, Applicant respectfully submits that Independent Claims 1, 13 and 24 are non-obvious in view of Barnett.

As noted above, Applicant has added new Claims 13-27. Support for these claims may be found at, for example, Paragraphs 0012, 0013 and 0018-0020 and Figure 1. Any necessary additional claim fees are calculated below.

For	Claims Remaining After Amendment	Highest Number Previously Paid For		Extra Claims	Rate		Additional Fee
Total Claims	20	- 20	=	0	x \$50	=	\$0
Independent Claims	3	- 3	=	0	x \$200	=	\$0
Multiple Dep. Claim	0	- 0		\$360		=	\$0
Total Fee						=	\$0

In light of the above remarks, it is believed that all claims in the application are now in condition for allowance, and such action is respectfully requested. Should any additional issues need to be resolved, the Examiner is invited to telephone the undersigned to attempt to resolve those issues.

Respectfully submitted,

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